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S129	09/808,018	JPAB,EPAB,DWPI,TDBD	((((delete or deleting or deleted or deletion) same ((repeat or repeated or redundant or expendable or superfluous or unneeded or unnecessary) adj frame))) and (dynamically or realtime or (real adj time) or (at adj run adj time) or (at adj runtime)))	☐
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S127	09/808,018	USPT	((((shot same (boundary or boundaries)) and (358/$.CCLS. or 382/$.ccls. or 348/$.ccls. or 345/$.ccls. or 386/$.ccls. or 725/$.ccls. or 463/$.ccls. or 359/$.ccls. or 600/$.ccls. or 355/$.ccls. or d16/$.ccls.))and ((determine or determining or determined or determination or calculate or calculating or calculated or calculation or ascertain or ascertaining or ascertained) near3 (shot adj (boundary or boundaries))))and (second adj frame)) and ((compensate or compensating or compensated or compensation or adjust or adjusting or adjusted or adjustment) same motion)	☐
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S126	09/808,018	USPT	345/$.ccls. or 386/$.ccls. or 725/$.ccls. or 463/$.ccls. or 359/$.ccls. or 600/$.ccls. or 355/$.ccls. or d16/$.ccls.))and ((determine or determining or determined or determination or calculate or calculating or calculated or calculation or ascertain or ascertaining or ascertained) near3 (shot adj (boundary or boundaries)))) and (second adj frame)	☐
S125	09/808,018	USPT	((shot same (boundary or boundaries)) and (358/$.CCLS. or 382/$.ccls. or 348/$.ccls. or 345/$.ccls. or 386/$.ccls. or 725/$.ccls. or 463/$.ccls. or 359/$.ccls. or 600/$.ccls. or 355/$.ccls. or d16/$.ccls.)) and ((determine or determining or determined or determination or calculate or calculating or calculated or calculation or ascertain or ascertaining or ascertained) near3 (shot adj	☐

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S121	09/808,018	JPAB,EPAB,DWPI,TDBD	(correlation adj coefficient) same (frame near3 (repeat or repeated or expendable or superfluous or unneeded or	☐

			redundant))	
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S118	09/808,018	USPT	((correlation adj coefficient) same (frame near3 redundant)) and (pal or secam or ntsc)	☐
S117	09/808,018	USPT	(correlation adj coefficient) and (pal or secam or ntsc)	☐
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S178	09/808,018	USPT	(358/$ OR 382/$ OR 348/$ OR 345/$ OR 386/$ OR 725/$ OR 463/$ OR 359/$ OR 600/$ OR 355/$ OR D16/$)!.CCLS. and (flash adj memory)	☐
S177	09/808,018	USPT	flash adj memory	☐
S176	09/808,018	USPT	((((348/152)!.CCLS.)) and ((compare or comparing or compared or comparison) same frame))	☐
S175		USPT	off adj specular adj reflection	☐
S174	09/808,018	USPT	(((348/152)!.CCLS.)) and ((compare or comparing or compared or comparison) same frame)	☐

S173	09/808,018	USPT	((348/152)!.CCLS.)	☐
S172	09/808,018	PGPB,JPAB,EPAB,DWPI,TDBD	(rate or speed) same frame same (reduce or reducing or reduced or reduction or decrease or decreasing or decreased) same camera same (store or storing or stored or storage) same (user or operator or viewer)	☐
S171	09/808,018	USPT	(358/$ OR 382/$ OR 348/$ OR 345/$ OR 386/$ OR 725?$ OR 463/$ OR 359/$ OR 600/$ OR 355/$ OR D16/$)!.CCLS. and ((rate or speed) same frame same (reduce or reducing or reduced or reduction or decrease or decreasing or decreased) same camera same (store or storing or stored or storage) same (user or operator or viewer))	☐
S170	09/808,018	USPT	(358/$ OR 382/$ OR 348/$ OR 345/$ OR 386/$ OR 725?$ OR 463/$ OR 359/$ OR 600/$ OR 355/$ OR D16/$).CCLS. and ((rate or speed) same frame same (reduce or reducing or reduced or reduction or	☐

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DIALOG(R)File 275:Gale Group Computer DB(TM)

01664217 SUPPLIER NUMBER: 15016374 (THIS IS THE FULL TEXT)
Ready for action: five video-capture boards bring motion video to your PC. (Creative Labs Inc.'s Video Blaster and VideoSpigot; Intel Corp.'s Smart Video Recorder; VideoLogic's Captivator; Media Vision Inc.'s Pro Movie Studio) (includes related article on data compression methods, glossary of terms and digital video tutorial) (Hardware Review) (Evaluation)
Goodman, Ben
Computer Shopper, v14, n2, p204(8)
Feb, 1994
DOCUMENT TYPE: Evaluation ISSN: 0886-0556 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 5814 LINE COUNT: 00444

ABSTRACT: Five full-motion video capture boards costing under $1,000 are evaluated and contrasted for features and performance. These include Creative Labs Inc's $399.95 VideoSpigot and $499.95 Video Blaster, Media Vision Inc's $449 Pro Movie Studio, Intel Corp's $699 Smart Video Recorder, and VideoLogic's $399 Captivator. VideoSpigot and Captivator, the lowest-priced offerings among these, both provide respectable performance, although VideoSpigot's software-based compression scheme is heavily dependent upon host CPU speed for image quality. Captivator, which can capture all popular video formats, may well be the best choice for a beginner. Pro Movie Studio uses 15-bit capture along with an custom onboard processor to speed up compression, losing some color but providing higher frame rates and smaller file sizes as a result. Video Blaster is the only board in this group that works with MS-DOS- and Intel 80286-based systems, but certain system incompatibilities may hinder its usefulness.

TEXT:

Company List
Video Blaster, VideoSpigot

Creative Labs Inc.
P.O. Box 6458
Salinas, CA 93912
1-800-998-5227
Sugg. List Price: Video Blaster--$499.95; VideoSpigot--$399.95

Smart Video Recorder

Intel Corp.

5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124
1-800-538-3373
Sugg. List Price: $699

Pro Movie Studio

Media Vision Inc.
3185 Laurelview Ct.
Fremont, CA 94538
1-800-845-5870
Sugg. List Price: $449

Captivator

VideoLogic
245 First St.
Cambridge, MA 02142
1-800-578-5644
Sugg. List Price: $399

Like its celluloid ancestors, desktop video is emerging from the Dark Ages. Gone are the days when choppy video flickered in a tiny window, after a hair-pulling installation reminiscent of a scene from Charlie Chaplin's Modern Times. With established multimedia players like Intel, Creative Labs, VideoLogic, and Media Vision selling motion-capture boards, and upstarts like Sigma Designs waiting in the wings with superb MPEG playback cards, desktop video is where the action is.

Desktop video is much more than simply being able to watch film or video on your VGA monitor. By letting you capture video to your hard drive, desktop video is capable of harnessing the interactive capabilities of the PC to the communicative power of full-motion video.

For presenters, the benefits of adding the sizzle of video to PC-based presentations are compelling. For those in the insurance, real-estate, or legal fields, video documents can be digitally **stored** in a database and treated just like text records. For the rest of us, the PC's video abilities mean that every home camcorder becomes a PC input device, just like a hand scanner.

Getting the Video In

Before you lay down your money on a motion-capture board, realize that digitizing motion video is one of the hardest jobs your PC can do. The basic problem is the vast amount of data necessary to simulate natural-looking video. Video, like film, consists of a sequence of still frames played back at high speed to simulate full motion. Film runs at a rate of 24 frames per second (fps); NTSC video runs at 30 fps. Video-digitizing cards grab some of these frames to provide your PC with a source of time-based image data, which can later be manipulated in your Windows business applications.

For a PC to capture a succession of 16-bit color images in a 640x480 VGA full-screen display, it would have to contend with a whopping 18Mb of data per second. Although this transfer rate is within the theoretical specifications for both the PCI and VESA expansion buses, capturing this much data would quickly overload any IDE or SCSI drive in existence, not to mention the fact that a 10-minute video would rapidly fill up even a one-gigabyte drive.

Compression/Decompression

To tame the video bitstream, motion-capture boards use compression/decompression (CODEC) algorithms to trim down the file sizes so that your PC can deal with them. These compression algorithms can execute either in software or with a hardware assist, which further improves performance. In a hardware-based solution, a dedicated coprocessor chip or digital signal processor (DSP) offloads the complex motion-capture mathematics from your PC, either during the capture process (like Intel's i750) or after the capture has been completed (like Cinepak).

Significant video-compression standards for the PC include Motion

JPEG, Cinepak, and Indeo. Motion JPEG breaks images down into pixel blocks and reduces them to mathematical frequencies, which are then filtered to reduce empty information.

Motion JPEG can achieve realtime compression ratios of between 10:1 and 20:1, but PC boards are just beginning to appear (see the sidebar MPEG and JPEG: The Best and the Brightest). Cinepak, now included with Microsoft's Video for Windows 1.5, is a software-only compression scheme; it can achieve 10:1 compression. Indeo has a 5:1 compression ratio, using Intel's i750 chip, and compresses and decompresses in real time.

Video for Windows

Microsoft's Video for Windows (VFW) is not a compression scheme. In the past year, however, it has become a standard for PC video, since it provides the standard shell that vendors customize for their specific hardware. An important part of the VFW standard is Microsoft's AVI (Audio Video Interleave) file specification. AVI allows audio to be captured along with video. Once captured, AVI files can be re-edited, graphically manipulated, and, in most cases, embedded in other Windows applications for playback. Every video-capture board examined in this article is capable of capturing video files in the AVI format.

VFW's latest version, 1.5, released in late 1993, includes Intel's Indeo 3.0, Cinepak, Motion JPEG, and YUV CODECs, improving upon its earlier performance (the original VFW specification allowed only a 1/16-screen window, at 15 fps). Version 1.5 lets you capture video to 320x240 pixels at 30 fps, using either Indeo 3.0 or Cinepak--short of full-screen display, but usable for most presentations. Although Computer Shopper was unable to get a copy of it in time to incorporate it into this article, every product reviewed here should be bundled with VFW 1.5 by the time you read this.

Lights, **Camera**, Action

To test the power of today's latest capture boards, Computer Shopper selected five candidates that offered the right mix of features and price. Each board had to be under $1,000, capable of full-motion capture, and widely available by mail. In addition, every board had to accept analog video from standard video sources (VCRs, **cameras**, or videodisc players), and capture AVI audio/video files.

Because video capture is an especially taxing task for both your PC's CPU and its **storage** subsystem, a fast 486 with a large hard drive is crucial. Our test system was a Dell 486DX2/66 with 24Mb of RAM and a 400Mb hard disk. We optimized the hard drive before each capture for the best hard drive performance, and used a Sony V-Deck Hi8 source to digitize in S-Video format (except for the Video Blaster, which digitizes only composite video). Our graphics card was a Number Nine GXE, and we tested 8-, 16-, and 24-bit capture and playback modes when available. Our workstation was also equipped with a Media Vision Pro Audio Studio 16-bit sound card.

Intel Smart Video Recorder

Intel's Smart Video Recorder is a 16-bit ISA board that uses Intel's own i750 chip to perform hardware-based compression of the incoming analog video stream. The board compresses the video before writing it to your hard disk, which has the advantage of separating capture frame rate and image quality from microprocessor speed.

In our capture tests, the Smart Video Recorder had no problems digitizing video to a 1/4-screen window, but the frame rate dropped to 15 fps using a 1/2-screen window. Full-screen capture was possible, using YUV 9-bit mode. In all cases, capture rates were high, and file sizes were among the lowest of the five boards we examined (about 9Mb per minute of video).

The software lets you set controls for image contrast, tint saturation, and brightness, and you can set both key frames and quality settings. The key-frame rate determines the amount of temporal compression (zero key frames being the lowest, five the highest). Intel suggests that sequences with a lot of motion should have lower key-frame settings than static images. The Quality setting establishes the overall trade-off between image quality and file size on disk. Unfortunately, using the highest compression settings produced such low quality that the AVI files

produced were almost impossible to use. Because Indeo is a scalable CODEC, make sure you set your settings as high as possible without dropping any frames.

The Intel Smart Video Recorder requires a 486SX/25 system or higher, Windows 3.1, 30Mb of hard disk space, a VGA card with at least 256 colors, and a sound card. The board accepts NTSC and PAL composite video through a standard RCA phone jack, as well as S-Video input through an RS-449 socket. As with all the cards examined below, a separate sound card is required to digitize audio into your AVI files.

At $699, the Smart Video Recorder is the priciest unit in the profile group, but its solid interface and the high-quality AVI files it produces make it a very credible choice for serious desktop video users.

VideoLogic Captivator

VideoLogic has been in the desktop video market for seven years with high-end cards known for sophisticated video functions, including NTSC encoding and videodisc control. The Captivator is VideoLogic's entry into the low-cost Windows video-digitizer-card market, and the company's experience shows, especially in the Captivator's easy installation routine. Before you seat the card, Captivator's installation software runs a quick diagnostic to see if you will have any configuration conflicts in its default mode. If it finds any, it will show you how to set the jumper on the Captivator board to a different position. This feature alone can save you hours of problem solving.

Once installed, the Captivator performs very well, especially when using VideoLogic's proprietary YUV CODEC. With this, the Captivator can perform realtime capture using software compression. (VideoLogic recommends that you recompress files with the Microsoft Video1 compressor once you have completed your captures.) While using this method resulted in reduced file sizes, image quality was not as good as when files were played back in the VideoLogic YUV format. Installing the YUV CODEC on a playback machine can be accomplished by running the VideoLogic Installer and selecting the Custom Install Option.

The Captivator does not provide any color controls for the video being captured. A gray-scale video-overlay window is available, so you can see your video on your VGA monitor while you capture it. (This implementation does not require a feature connector on your graphics card.) This feature is especially useful if you are looking to capture a specific video frame to print out or to import into another application.

Although the Captivator doesn't come with any cables, it can capture both NTSC and PAL composite and S-Video formats. Capture-window sizes include 1/4-,

1/2-, and full screen. It requires a 386SX/20 or higher with 4Mb RAM, Windows 3.1, and a sound card. Software includes Video for Windows and VideoSnap, a still-motion-capture utility.

VideoLogic's Captivator, at a list price of $399, is a solid performer for the budget-conscious. This easy-to-use board may be the best choice for the novice, especially if he or she is equipped with a lower-horsepower PC.

Creative Labs Video Blaster

The Video Blaster from Creative Labs has been on the market since April 1992--and is beginning to show its age. It can capture a 1/8-screen window of 160x120 video at a maximum of 15 fps, but only in 8-bit (256 color) VGA mode. Resolutions higher than 800x600 are not supported, nor is S-Video. NTSC and PAL composite are the only formats the board can handle. In addition, the card should not be used in systems with more than 15Mb of RAM, due to memory-mapping constraints. Because the Video Blaster must be connected to a feature connector on your VGA card in order to perform video overlay, it's best to install the card in a 16-bit slot directly next to your VGA card.

Although the Video Blaster has audio input and output connectors, a look at the VBLASTER.WRI file states, Do NOT use the analog audio channel inputs to the Video Blaster. These channels are not capable of digitizing sound, so you must have some other wave audio device to capture sound. In its present form, this card seems more suited to still-image capture or for overlaying computer graphics on an analog video source than for motion

capture. The Video Blaster allows control of hue, saturation, brightness, contrast, and RGB, and support for JPEG compression makes single-frame capture quite efficient.

The Video Blaster captures at window sizes from 1/8-, 1/4-, 1/2-, and full screen at 640x480. It comes with a breakout cable that contains three RCA composite video inputs, and requires at least a 286 and a VGA card with a feature connector, a sound card, and between 1Mb and 15Mb of RAM.

The Video Blaster's suggested list price of $499.95 definitely puts it toward the higher end of the price range, among boards in the profile group. In its favor, it is the only motion-capture board in the group offering both DOS and 286 compatibility, which should endear it to a large installed base of PCs.

As this article was going to press, Creative Labs announced a new version of the Video Blaster, the FS200, which offers both S-Video input and the ability to use more than 16Mb of system RAM.

Creative Labs VideoSpigot

Arriving on the market in December 1992, the VideoSpigot was originally developed by SuperMac Technologies. Now it's licensed, distributed, and supported by Creative Labs. The VideoSpigot neatly steps in to fill some of the gaps left by the Video Blaster's motion-capture abilities.

The VideoSpigot works with the Cinepak CODEC now distributed with Video for Windows. Like the Captivator, this card performs realtime software-based compression, and its installation process provides a system-scanning option that checks for IRQ and base-memory-address conflicts. Once it was installed, we achieved image quality and frame rates on a par with the hardware-compressing Smart Video Recorder. Because the VideoSpigot does compress in software, however, be aware that image quality and frame-capture rates are highly dependent on the speed of your computer's CPU.

The VideoSpigot software does not allow for much fine-tuning of saturation or contrast, although hue-adjustment control is available. The VideoSpigot can capture 16- and 24-bit color from NTSC, PAL, and SECAM standards, and can achieve file-compression ratios of up to 20:1. Using the Cinepak compressor after capture was slower than with other CODECs, but the resulting files had superior image quality and playback speed, even as compression ratios got higher. The compression software offers control of several variables, such as data rate, making it well-suited for use in CD-ROM authoring projects.

The VideoSpigot for Windows requires a 386DX/33 or higher with 8Mb RAM, Windows 3.1, and a sound card. Capture-window sizes range from 1/8-, 1/4-, and 1/2-, to full screen at 640x480. Video inputs include composite and S-Video.

The VideoSpigot offers high performance and an attractive software bundle. With a list price of $399.95, it shares low-price honors with VideoLogic's Captivator. All in all, the board is a good choice for a serious mid-level DTV workstation.

Media Vision Pro

Movie Studio

The Pro Movie Studio board has some features that are not available on any of the other cards reviewed. In addition to a custom chip that performs onboard compression, the Pro Movie Studio captures in 15-bit rather than the commonly used 16-bit mode. One less bit reduces the number of colors available for display, yet it also reduces the amount of data that must be compressed and passed through the system. Frame rates are higher and file sizes are lower as a result.

The Pro Movie Studio's compression controls offer an extensive set of options, including a Worksheet that samples the video source and calculates frame-rate, data-rate, and space-per-minute requirements, depending on the size and quality settings. Capture sizes can be customized from 320x240 to 44x32 (the smallest capture window of any board in this comparison).

The software provides complete image controls, including brightness and contrast as well as anti-gamma, detail, sharpness, and several video filters. These controls allow you to improve the image quality of your

video material and compensate for unforeseen problems during shooting, e.g., poor lighting conditions. You can also adjust the horizontal and vertical positioning of the digital video within its window.

The Pro Movie Studio requires a 386sx/20 or higher, 4Mb of RAM, Windows 3.1, and a sound card. It captures in 8-, 15-, and 24-bit color modes, and the board accepts Composite and S-Video in NTSC, PAL, and SECAM standards.

Media Vision's board offers the most advanced video adjustment options and controls of any unit in the group. Although its $449 suggested list price is among the highest in the group that is profiled here, the flexibility that these controls bring to the motion-capture process more than makes up for its higher-than-average price.

Desktop Video for Tomorrow

1994 promises to be a year of great activity in the performance and ease of use of desktop video tools. MPEG- and JPEG-based solutions will likely be the focus, although solutions like the ones examined here will also undergo incremental improvement.

1994 will also be the year that products using VESA's new VESA Media Channel (VMC) will appear. This dedicated 132Mb/sec multimedia bus is well-suited for decoupling high-bandwidth video streams from both processor- and bus-related bottlenecks.

Given video's role as a central pillar in all new multimedia architectures, the promise of using accessible computer-based tools to blend audio, text, graphics, animation, and video is likely to be fulfilled this year. The five boards examined here represent true progress in both the technology of desktop video and the affordability they bring to the market. They are also the first real tools for the PC **user** who wants to bring a presentation to life without having to go rent a film studio in the process, and that should put just about anyone in motion.

Related Article

Ready for Prime Time: High-End Video Production for the PC

Using your PC to replace a $100,000 professional video studio isn't a pipe dream anymore, thanks to two plug-and-play video-production systems from Fast Electronics and Matrox Electronics Systems. While these systems are significantly more expensive than ordinary motion-capture boards (they range from $5,000 up to nearly $16,000, depending on configuration), they're more than capable of dishing up true broadcast-quality video.

Unlike motion-capture cards, which digitize video to your hard drive, the Fast Electronics and Matrox systems bypass your PC's I/O bottleneck by keeping video within the analog domain. They use your PC's horsepower to coordinate edits, create digital video effects (DVEs), and generate titles and graphics overlaying the video. The result is a finished videotape with professional cuts, crossfades, wipes, and dissolves.

The editing process begins with the logging of your videotapes. Using onscreen shuttle controls, you can review your tapes and tell the editing system where the useful clips are. The system records the exact frame location of each edit point, and each clip can be iconized. Just drag each icon to an onscreen timeline to assemble, reassemble, and otherwise fine-tune your edits.

To use either of these systems, you'll need a few pieces of professional--or at least prosumer--video equipment, including an NTSC video monitor to view your tapes, one master videotape recorder (VTR) to record your work, and at least two videotape players to play back source tapes.

Fast Electronics' Video Machine consists of a single full-length ISA card. It requires a 486/33, Windows 3.1, and between 8Mb and 16Mb of RAM, plus a VGA card that's capable of resolving at 800x600 or better at 8-bit color levels. Matrox's Video Studio consists of five EISA cards, and includes a VGA card supporting 640x480 with 8-bit color. You'll need a Matrox-approved PC to run it. Edit-control drivers for a range of prosumer, industrial, and broadcast-quality decks are supplied, and each system supports SMPTE, Control-L, Control-S, Panasonic 5-pin, V-LAN, and ARTI

protocols for remote machine control.

Fast Electronics can be reached at (508) 655-3278; Matrox is at 1-800-361-1

Related Article

408MPEG and JPEG: The Best and the Brightest

Introduced in late 1993, Sigma Designs' $449 ReelMagic board seemed to do the impossible: It played back beautiful 30-fps video from CD-ROMs, with CD-quality, 16-bit pulse-code-modulation (PCM) audio to boot. Coupling MPEG's near-200:1 compression rate to some fast DSPs yielded the best PC video ever seen, even if it was playback only. Furthermore, thanks to ReelMagic's pass-through architecture that uses the VESA feature connector of 16-color or better VGA cards to map decompressed 32,768-color video directly to your monitor, its hardware requirements were also highly favorable: a 386SX/16, a single-speed CD-ROM, and a 16-bit sound card.

True, the software bundled with ReelMagic was initially sparse (Activision's popular 1980s game, Return to Zork, is currently the only application bundled with ReelMagic), but this didn't overshadow the significance of Sigma's product. For developers, the prospect of delivering 72-minute CD-ROM-based movies and full-motion games was perhaps the most thrilling development since the invention of the floppy disk. Developers hopping on Sigma's MPEG include Activision, Artisoft, Compton's NewMedia, ReadySoft, and Video Toys, with mega-companies like Paramount and Sony also eyeing the format for possible delivery of mainstream video titles.

Another company, Xing Technology Corp., recently unveiled a new MPEG capture and playback board called XingIt! for $499. While the board was not ready in time for testing, it does signal what may become the best of both worlds: capture and playback using the MPEG standard at least in one mode. Expect to hear more about this product and others over the next few months.

While the MPEG/VideoCD format has surefire appeal for developers, users who want to do their own PC-based motion capture aren't being left in the dark, thanks to the arrival of new motion-capture cards based on the Motion JPEG CODEC. Motion JPEG, unlike MPEG, has the advantage of being a technology easily incorporated into low-cost capture boards. (Compressing applications for MPEG is so processor-intensive that you need to use a service bureau, at a rough cost of $50 per minute.) As this issue went to press, Diamond Computer Systems was rolling out its new Motion JPEG-based board, the VideoStar Pro, which delivers 30-fps half-screen capture (320x240) and carries a suggested retail price of $529.

A demonstration of the VideoStar Pro at Computer Shopper's offices showed very smooth video capture, with compression achieved in real time. The VideoStar Pro is compatible with Microsoft's AVI specification, and its system requirements are modest: a 486SX, a video board with a VGA feature connector, and a 120Mb hard drive. Of course, when dealing with any motion video--even compressed motion video--it helps to have as large a hard drive as you can afford.

Related Article

Video Glossary

AVI (Audio-Video Interleave): This is the native file format for Microsoft's Video for Windows. AVI interleaves digital audio and video information into a composite file that can be embedded or linked within Windows applications.

Cinepak: This is a compressor/decompressor (CODEC) developed by SuperMac that provides for 12- to 30-fps video playback in a 320x240-pixel window. Cinepak's compression ratio is approximately 20:1; because it is a software CODEC, fast PCs play back video at better frame rates than slow ones.

CODEC: This basic engine is used to convert and compress analog video signals into digital form during video capture and to decompress these files during playback. CODECs come in many flavors, and can be either proprietary to a single board vendor or industry-standard such as Cinepak, Indeo, and Motion JPEG. CODECs can be implemented either in software or with a hardware assist.

Composite Video: This is a common method used by consumer-grade video decks to combine video chrominance and luminance signals into one stream. Inferior to S-Video, as used in the Hi8 format, composite video devices are usually identifiable by a single RCA-connector video output or input jack.

DVI (Digital Video Interactive): Intel's proprietary CODEC technology uses its own i750 processor. DVI has two levels: presentation-level video (PLV), and realtime video (RTV). PLV offers full-screen 30-fps playback, but creating PLV video requires the use of a service bureau at the approximate cost of $200 per minute of finished video. RTV capture can be achieved at the PC level, but is inferior to PLV.

Indeo: Intel's software-only decompression scheme is now licensed to third-party developers. Indeo requires Intel's i750 chip for realtime capture.

Motion JPEG: This CODEC was developed by the Joint Photographic Experts Group. With a hardware assist, Motion JPEG can achieve realtime motion capture of video, but not audio, in compression ratios of between 10:1 and 20:1.

MPEG: This standard CODEC (developed by the Moving Pictures Experts Group) requires a hardware assist and offers a very high (between 40:1 and 200:1) compression ratio. Currently, MPEG is best suited for playback of motion video and audio from low-bandwidth devices, especially CD-ROMs. Realtime compression with MPEG can only be achieved offline, using expensive dedicated PC hardware.

NTSC: Created by the National Television Standards Committee, this has become the standard method of delivering analog video information in the United States. NTSC calls for a 525-line picture, using 60 interlaced half-frames for each second of video.

QuickTime: Similar to Cinepak, QuickTime is Apple's software-only playback scheme, which can achieve 15-fps video in a 320x240-pixel window.

S-Video: Used by Hi8 camcorders, S-Video splits the video signal into chrominance and luminance channels, providing a superior picture to composite video as used in standard 8mm camcorders.

VideoCD: This is the nickname for the MPEG method of delivering 30-fps, 640x480 video with 16-bit stereo sound on CD-ROMs.

YUV: Analog S-Video's native format, with separate chrominance and luminance channels, YUV is a CODEC that digitizes each channel independently. Files encoded in YUV are converted to Windows' native RGB color format during decompression.

Related Article

How to Make AVI Movies

What the Manuals Don't Tell You

Here's the scenario: Your boss has just returned from an industry retreat where a whole afternoon was spent covering new technologies that will gain your company that much-sought-after competitive edge. After seeing dozens of samples of AVI files, your boss becomes convinced that it's time to put some of this new technology to use. Why can't we incorporate some video footage of customer testimonials in our presentations? the boss asks. Piece of cake! you reply--after all, you've seen the same demos, and even watched them play back on your very own PC. Good! says the boss. Put something together and I'll show it to the head of marketing next week. You mumble something about needing some time to videotape a few customers first and buy yourself another week.

This scenario may not be lurking in your in-box just yet, but it may well be in the near future, so please take note of a few tips from the trenches. What follows is everything you wanted to know about constructing a desktop video presentation, but probably didn't know you should ask.

Planning Your Video

Once you've decided to incorporate video into an existing presentation, the first step is to review the presentation with the presenter and determine where video would add most to the message being communicated. In some cases, a 20-second video clip can replace several slides in a presentation. The size and frame rate of AVI files on most PCs is best suited for interviews (where there are minimal changes between

frames, hence maximum compression). On the other hand, close-ups showing complex details and moving parts of a machine do not currently translate well.

For this example, we will assume you are going to add a few interviews to a Microsoft PowerPoint presentation. We will also assume that you intend to play the presentation from disk before a large audience using a video-projection system or large monitor.

Unless you have access to professional video equipment, choose a Hi8 or S-VHS **camera** to record your subject matter. Either format provides significantly better-quality video than standard VHS. While virtually all PC-based capture boards can handle ordinary composite video signals, you'll see the difference if you play back the video in a large window, especially on a large monitor.

Before going out to videotape your interview, script your questions in as much detail as possible. Try to plan your shots; consider the location of the shoot, and be aware of environmental factors such as lighting and ambient noise. If you have access to an experienced video crew, take advantage of it. If not, try to bring along at least one assistant who can help with the lighting, monitor the audio, and simply watch for all the things you'll miss during taping. The last thing you want is to have to reshoot the interview with the CEO just because he had mustard on his mustache, or because someone in the window behind him was waving at the **camera**.

Logging Your Takes

Once you've shot all the video footage you need, the next step is to log your footage. You can do this either on your PC if you have a couple of gigabytes of **storage**, or simply by manually shuttling back and forth with your videotape player while taking notes in front of your TV monitor. The purpose of logging is to locate those segments on your tape that contain the shots you want to use in your final presentation. Realistically, you should probably plan to end up with under three minutes of finished material. (If you can keep your selections down to about five minutes, you will save yourself a lot of time.)

Remember that your PC will need a sound card in order to capture the audio from your camcorder, since most entry-level video-capture cards lack this capability.

Frame Rates and Window Sizes

Capturing an AVI file is still more of an art than a science. Determining the proper capture rate and compression settings will depend on the speed of your capture system and the capabilities of your intended playback platform. For example, if your playback system will not be configured with stereo speakers, there is no reason to capture stereo audio.

It is highly recommended that you test your capture files on the playback system before spending lots of time putting them together. You can start out by capturing 30 **frames** per second at full resolution in a 160x120-pixel window. If your card doesn't drop any **frames** during capture, try importing it into your presentation and view it on the playback system. If it looks fine, try increasing the window size. You can **reduce** the color depth to 16 bits and bring the **frame rate** down to about 15 fps and still get reasonably smooth motion. Likewise, a 11KHz audio-sampling **rate** can produce acceptable results, especially if your playback audio system is not very high-end.

After you have determined what you want to digitize into the computer, you can capture the footage with any of the cards profiled here. The result of all these labors should be several AVI files containing the video and audio you want. These files are the raw material that you will be using to construct your presentation; now we can set about refining them into the finished AVI files for the presentation.

Getting It All Together

Here's where the fun begins. Using Adobe Premiere 1.0, import the AVI files and other graphics you want to use and edit them together so they communicate our message. You can create graphic files from any Windows graphics program, displaying the name and title of each person you

interview, and then superimpose these files on the motion video. The title files are full-size graphics anti-aliased on black containing an alpha channel.

One effective technique is to start each video clip with the name and title of the speaker, then dissolve in the video of that person. At the end of each clip, you can transition back to a one-word graphic like Quality, Service, or Trust in order to summarize the overriding theme of the presentation.

Controlling audio is crucial for an effective PC-movie presentation. Using Adobe Premiere's editing features to construct your first sequence from two or three AVI files, insert transitions between them to make the clip flow smoothly without any jarring jump cuts. Then fade the audio up and down between cuts to further enhance the seamless quality of the transitions. During this process, you can preview your work to see how well it communicates the intended message. When you're satisfied, choose Make Movie--Premiere will compress all the disparate files into one single AVI file.

Once you have constructed all of the AVI files, the final step in the process is to import these files into the PowerPoint presentation, by importing the AVI files into the appropriate slides. With any luck at all, your boss will be so pleased by the results that you'll get the go-ahead to purchase that new super-fast, two-gigabyte drive you've been eyeing recently. Now all you have to do is convince the boss to give you a multimedia portable so that you can port your movie for the field sales team....

Connecting via Winsock to Dialog

Logging in to Dialog

Trying 31060000009999...Open

DIALOG INFORMATION SERVICES
PLEASE LOGON:
 ****
ENTER PASSWORD:
 ****
Welcome to DIALOG

Dialog level 02.18.00D

Last logoff: 12aug03 15:54:11
Logon file001 12aug03 15:59:19
* * * * See HELP NEWS 225 for information on new search prefixes
and display codes

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*File   2: Alert feature enhanced for multiple files, duplicates
removal, customized scheduling. See HELP ALERT.
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        (c) 2003 The Dialog Corp.

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Processing
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(store or storing or stored or storage) and (user or operator or viewer)
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reduction or decrease or decreasing or decreased)) and (camera or cameras) and
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Processing
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Processing
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 2/K/1     (Item 1 from file: 8)
DIALOG(R)File   8:(c) 2003 Elsevier Eng.  Info. Inc. All rts. reserv.
```

Abstract: A motion analyzer is used to capture images from a high **speed** video **camera** and **store** the images in real-time for review. Once the images are **stored**, they may be reviewed in slow motion while quantitative measurements can be made for analysis. Motion analyzers are powerful tools for industry and science for viewing high-**speed** subjects. A subject could be virtual anything which moves faster than the eye can perceive. Industrial imaging of high **speed** subjects can provide the understanding for improving quality, trouble-shooting a problem, increasing capacity, **reducing** set-up time, and advancing research. Companies throughout the world are using motion analyzers to remain competitive. The evolution of motion analyzer

09/808,018

Connecting via Winsock to Dialog

Logging in to Dialog

Trying 31060000009999...Open

DIALOG INFORMATION SERVICES
PLEASE LOGON:
 ****
ENTER PASSWORD:
 ****
Welcome to DIALOG

Dialog level 02.18.00D

Last logoff: 11aug03 14:15:32
Logon file001 12aug03 15:38:30
*** ANNOUNCEMENT ***
***
--File 654 - US published applications from March 15, 2001 to the present are now online. Please see HELP NEWS 654 for details.

***
--File 581 - The 2003 annual reload of Population Demographics is complete. Please see Help News581 for details.

***
***
--File 990 - NewsRoom now contains February 2003 to current records.
File 992 - NewsRoom 2003 archive has been newly created and contains records from January 2003. The oldest months's records roll out of File 990 and into File 992 on the first weekend of each month.
To search all 2003 records BEGIN 990, 992, or B NEWS2003, a new OneSearch category.
***
--Connect Time joins DialUnits as pricing options on Dialog.
See HELP CONNECT for information.
***
***
--SourceOne patents are now delivered to your email inbox as PDF replacing TIFF delivery. See HELP SOURCE1 for more information.
***
--Important news for public and academic libraries. See HELP LIBRARY for more information.
***
--Important Notice to Freelance Authors--
See HELP FREELANCE for more information
***
NEW FILES RELEASED
***World News Connection (File 985)
***Dialog NewsRoom - 2003 Archive (File 992)
***TRADEMARKSCAN-Czech Republic (File 680)
***TRADEMARKSCAN-Hungary (File 681)
***TRADEMARKSCAN-Poland (File 682)
***
UPDATING RESUMED
***
RELOADED
***Population Demographics -(File 581)
***CLAIMS Citation (Files 220-222)

D9/808,018

REMOVED
***

>>> Enter BEGIN HOMEBASE for Dialog Announcements <<<
>>> of new databases, price changes, etc. <<<
****
* * * * See HELP NEWS 225 for information on new search prefixes
and display codes

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File 1:ERIC 1966-2003/Jul 23
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HILIGHT set on as ''
?
PLEASE ENTER A COMMAND OR BE LOGGED OFF IN 5 MINUTES
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344 345 347 370 371 434 647 674 696
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Processing
Processed  10 of  32 files ...
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         3771749  RATE
         1937262  SPEED
          756110  FRAME
          183024  FRAMES
         1437484  REDUCE
          877135  REDUCING
         2146631  REDUCED
         1982441  REDUCTION
         1153097  DECREASE
          382900  DECREASING
         1096420  DECREASED
          432340  CAMERA
          148101  CAMERAS
          341355  STORE
          288800  STORING
          715658  STORED
         1692054  STORAGE
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Flash memory

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Flash memory is a form of EEPROM that allows multiple memory locations to be erased or written in one programming operation. Normal EEPROM only allows one location at a time to be erased or written. All types of flash memory and EEPROM wear out after a certain number of erase operations.

Flash memory is made in two forms: NOR flash and NAND flash. The names refer to the type of logic gate used in each storage cell. NOR flash was the first type to be developed, and was invented by Intel in 1988. It has long erase and write times, but has a full address/data (memory) interface that allows random access to any location. This makes it suitable for storage of program code that needs to be infrequently updated, as in digital cameras and PDAs. Its endurance is 10,000 to 100,000 erase cycles. NAND flash from Toshiba followed in 1989. It has shorter erase and write times, higher density and lower cost per bit than NOR flash, and ten times the endurance, but its I/O interface allows only sequential access to data. This makes it suitable for mass-storage devices such as PC cards, Compact Flash cards and Secure Digital media.